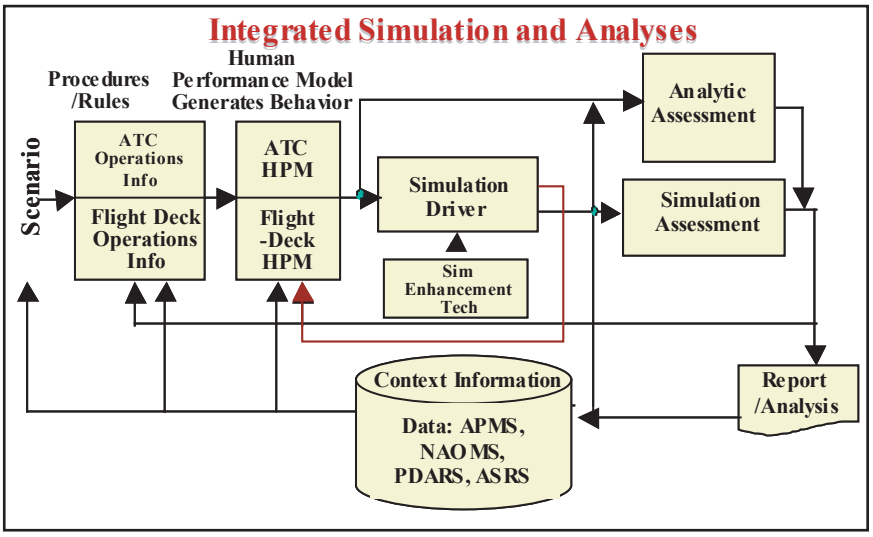
Human Factors

research and technology division

Modeling and Fast-time Simulations (M&S)

Objective

Modeling & Simulations is an element of the ASMM Project to provide technology and procedure developers with reliable predictions of the system-wide effects of the changes they are introducing into the National Airspace System (NAS).



Approach

The M&S element will establish consistent and predictable relationships among elements of the NAS with emphasis on incorporating appropriate human-behavioral models. This serves as a computational test bed for simulating and analyzing system performance, including the contributions of individual operators, individual elements of the system, technologies and large-scale system flow and control issues. Fast-time simulations will be used to support safety-risk assessment, identify performance metrics, and focus requirements for the more expensive human-in-the-loop simulations.

Impact

The following major milestones have been accomplished:

- In FY'01, the dynamic linkage of SJSU's Air MIDAS representations of multiple controllers and pilots, Ga Tech's Reconfigurable Flight Simulator, and the ATAC Corp's aggregate output statistics was demonstrated in a simulation that studied effects of timing of a warning display of clear-air turbulence encounter.
- In FY'02, the results of a simulation using linked multiple models of a scenario of in-close approach changes were verified against NAOMS, PDARS, and APMS data.
- In FY'03, the results of a simulation using linked multiple models of scenarios of Time-based Metering and Miles-in-trail Metering were validated against PDARS and APMS data.

In each case, the question was: How are workloads and traffic patterns impacted by timings and tasks? These simulations demonstrated the potential for a system-wide perspective on causal analysis and risk assessment.

Information Technology

M&S incorporates the most advanced tools for modeling human performance and for merging these with innovative technology for efficient fast-time Monte Carlo simulations and with automated tools for assessing safety risks from a system-wide perspective.

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